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IMPLEMENTATION OF AN ONLINE LEARNING SYSTEM FOR PRACTICAL CLASSES USING ANIMATED INSTRUCTION

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Abstract
This paper presents the implementation of a learning system for practical courses using animated instruction. Learning systems are popularly used presently to deliver educational contents at various levels and animated instructions provide effective learning results since it deals with the visualization of concepts. However, existing learning systems which have been used to deliver knowledge have not implemented animated instructions in their design especially for practical classes which will help to further improve knowledge dissemination and interactions. To implement the practical learning system, data about practical classes was collected through online sources and from the department of ICT, Osun State University. The system was designed for programming practical courses and resulting prototype implemented as an interactive web-based learning system that can be used for practical courses using animations.

Introduction

The study of many science subjects faces the challenges of low enrolment and poor performance of students, these can be linked to non-utilization of effective media, learning tools and interactive learning platforms to facilitate learning. Media refers to various means of communication e.g. television, radio, newspaper, magazine, etc. Media can be used for mass broadcasting and schools learning programmes (Ismail et al., 2017). The virtual learning approach has become a popular method in the process of teaching and learning in order to facilitate the delivery of content. The

world is changing faster than ever before in the delivery of contents through technological means by learning systems and the needs of students are changing with them. (Gamage et al., 2020)

A learning system is a system which provides a compilation of data about resources for learning; a means for creating and storing learning resources; a means for access to learning resources. Specifically, a learning system is software that is created specifically to produce, organise, and manage educational content delivery (Nyirenda, 2019). Many Learning systems have been implemented at primary, secondary and tertiary education level. Existing learning systems which have been used to deliver knowledge have not implemented animated instructions in their design especially for practical classes which will be done in this project to also to help to improve knowledge dissemination and interactions.

While traditional whiteboards are still very helpful, educational technology has evolved greatly in recent years, offering educators a wide range of tools to keep students more engaged and ignite their passion for learning. In this regard, interactive learning is a good approach. Interactive learning in this context means computer-based learning system which responds to the students' actions by presenting contents such as texts, graphics, animation, video, audio etc. (Zhang et al., 2006). Traditional reading and memorization habits can be changed with interesting contents by effective use of technology (Islam et al., 2014). Today students are more and more surrounded by visual (animation) technology (computers, chat, email, and the web) so, for them, it is natural to expect media techniques incorporated in the learning materials.

According to Jawed et al., 2019, "sixty-five (65%) percent of students are visual learners", which means that using visual aids in class can dramatically improve learning and help students retain more from what they hear (Jawed et al., 2019), (Ismail et al., 2017). Students spend considerable parts of their time doing a wide range of practical or laboratory work in many science and engineering schools. Here, the learning allows students to practice and develop a wide range of discipline-based techniques and personal skill. Using animated instructions will have more advantage in effectiveness, efficiency and learnability over the practical manuals (Jia, 2014).

Animation based learning is the process of using animated videos as visual aid to facilitate learning and improve performance (Barut Tugtekin and Dursun, 2022). This approach to learning has proven over time to be very effective across various fields, including scientific evaluation, corporate online training, and university course. Animation is a technique that manipulates figures make them appear as moving images (Alhumaidhi, 2020) and is discovered to be very important in the teaching process, when properly used it provides a visual learning environment that stimulates learning. The importance of animation today in educational process is quite significant. Animation has dominated the instructional process in recent years, because of its great potential in the learning process (Kwasu and Ema, 2015).

This paper describes a web-based learning system that is developed to deliver practical knowledge for students through animated instructions. The system was implemented for major practical based programming courses at the tertiary level. The study is an effort to explore the effectiveness of an animated based student practical learning system which will be beneficial for practical purposes. The learning system can bridge knowledge and expertise and become an interdisciplinary learning material for students.

Methodology

To develop the online learning system a sequential developmental approach was followed which included: data collection; design and implementation, with a client- server architecture as shown in Figure 1 where the practical learning system provides content to the users and the users interact with the system storing relevant contents in a repository. Relevant data about the methods and conduct of practical classes for programming courses were gathered from online sources and the department for ICT software laboratory through observation of practical processes and interactions with the laboratory technicians. Information such as course details (course code, title, instructions, etc.) and technical contents were studied in order to incorporate into the design of the learning system. Figure 2 shows a sample of a section of the practical manual used for Java programming course.

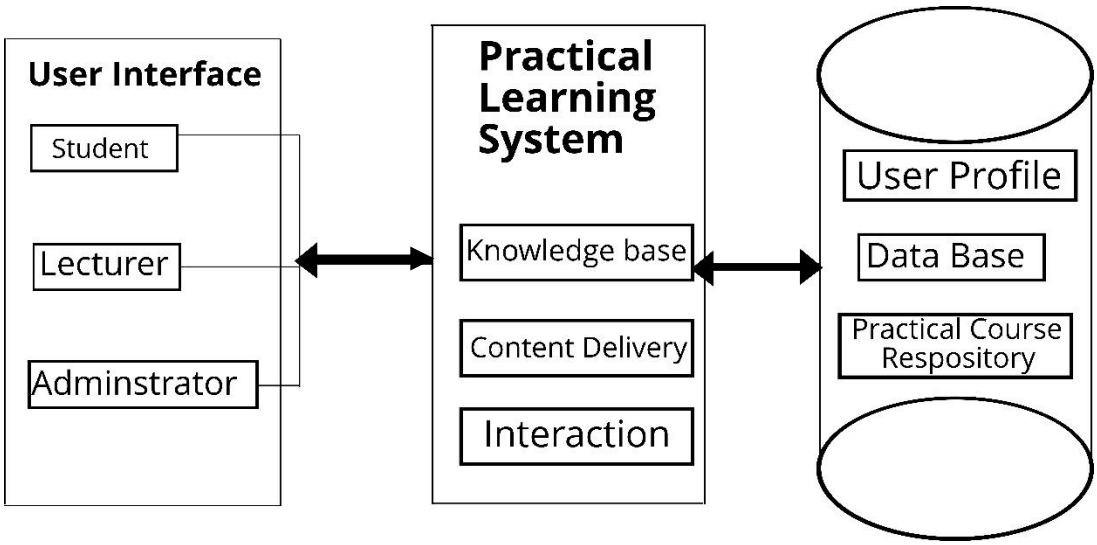
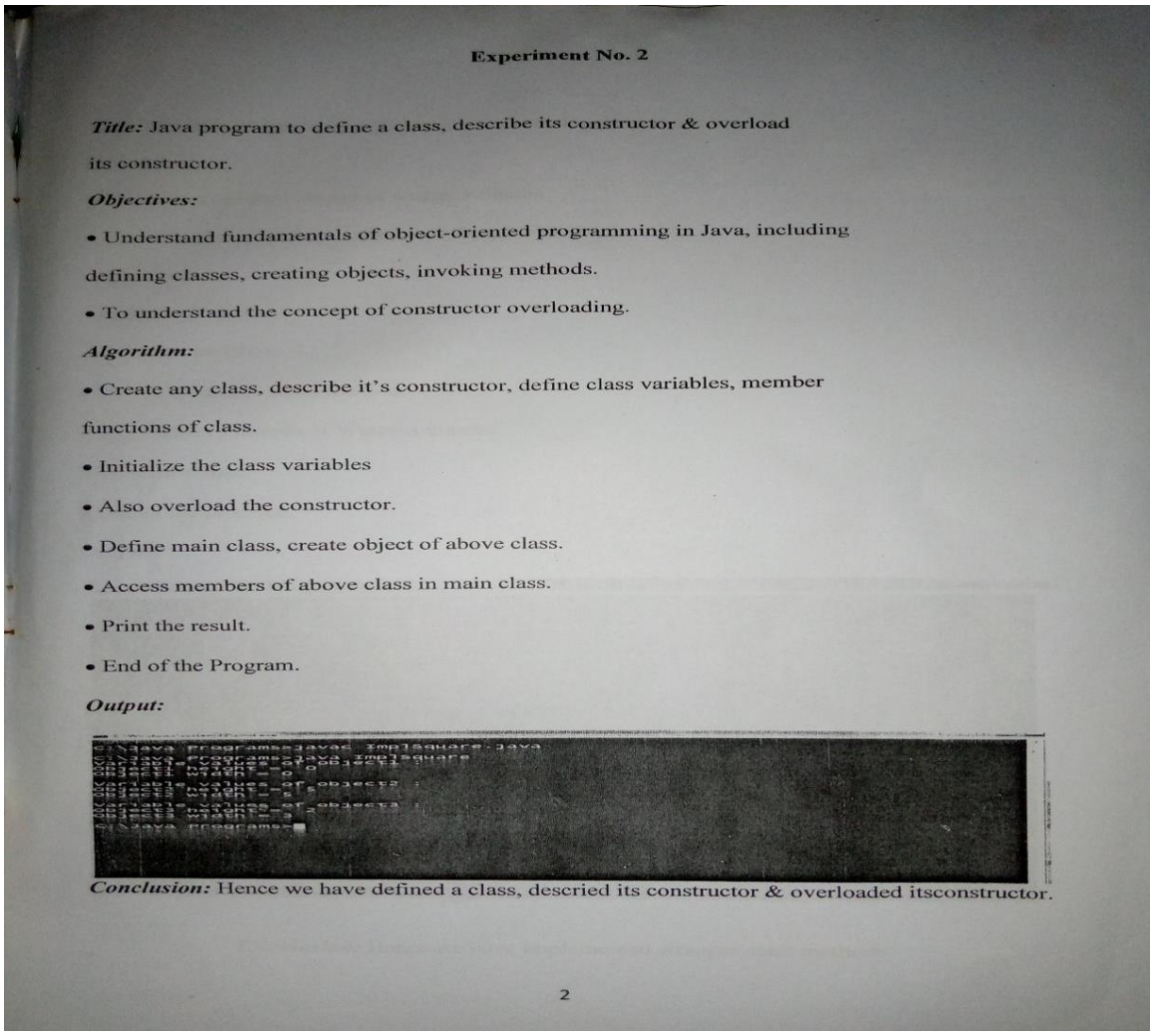


Figure 1: Architectural Diagram for the system



Experiment No. 2

Title: Java program to define a class, describe its constructor & overload its constructor.

Objectives:

- Understand fundamentals of object-oriented programming in Java, including defining classes, creating objects, invoking methods.
- To understand the concept of constructor overloading.

Algorithm:

- Create any class, describe it's constructor, define class variables, member functions of class.
- Initialize the class variables
- Also overload the constructor.
- Define main class, create object of above class.
- Access members of above class in main class.
- Print the result.
- End of the Program.

Output:

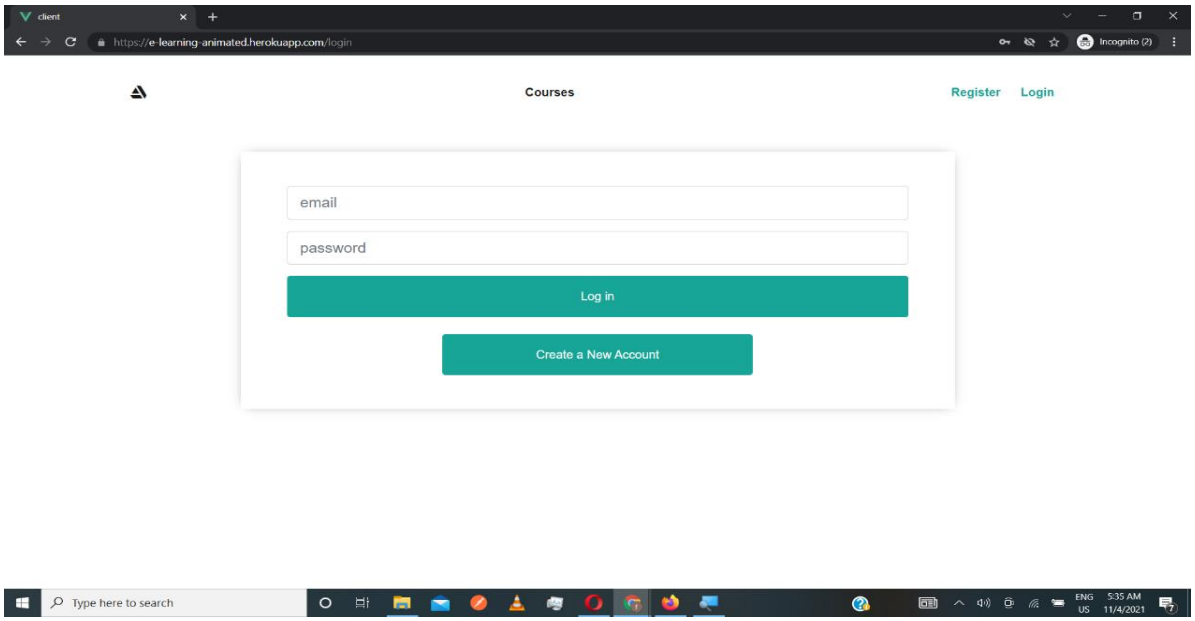
Conclusion: Hence we have defined a class, descried its constructor & overloaded itsconstructor.

2

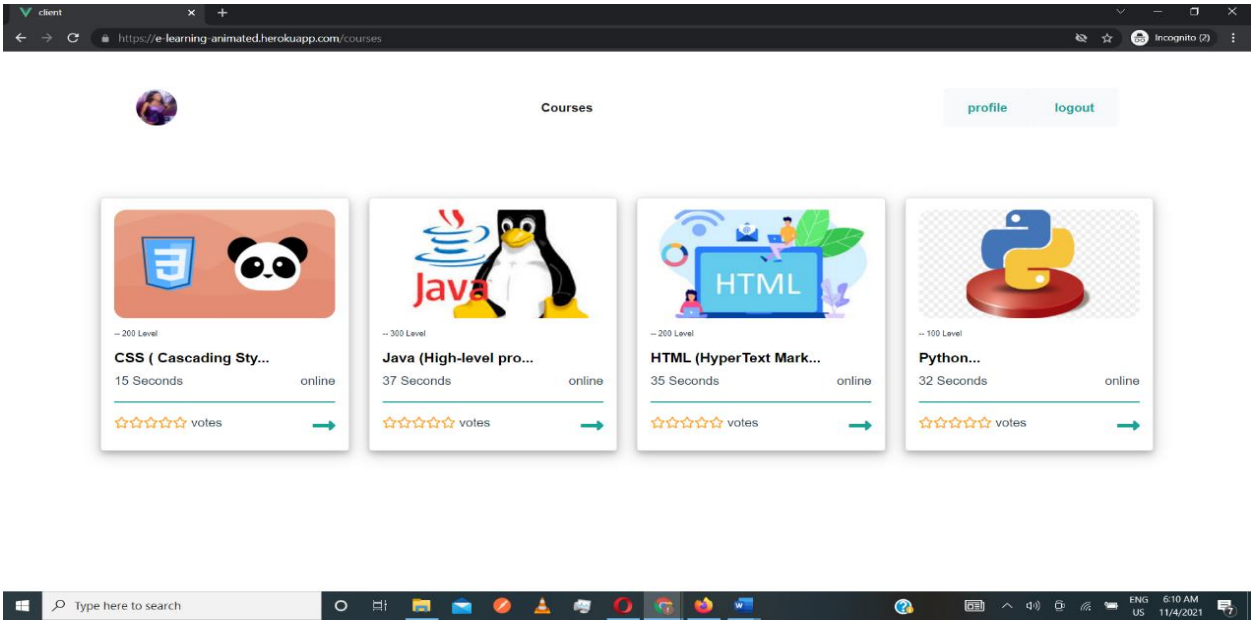
Figure 2: Sample of practical manual

Implementation and Results

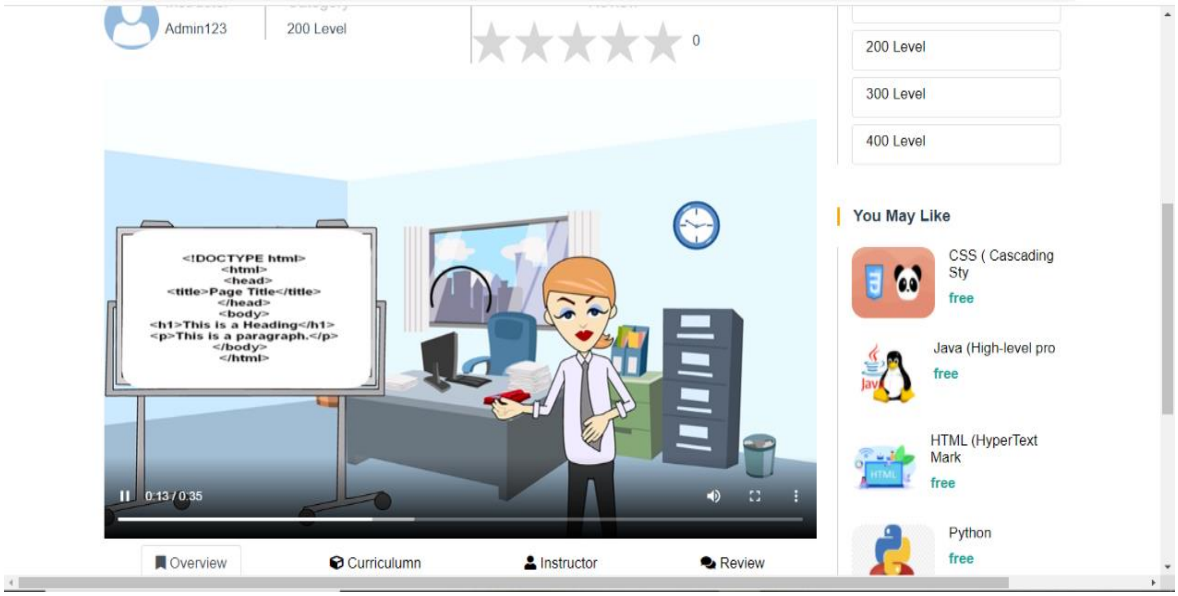
A mockup of the learning system was designed initially to understand and include the functions needed for the prototype implementation of the system. The system prototype was implemented in Visual Studio, using Hypertext Mark-up Language (HTML), CSS, Bootstrap, JavaScript, MongoDB, Vue js, Node js and Express js. The Animated practical learning system will work on a minimum of 1GB RAM and a processor of 1.6 GHz. The interfaces for the implemented learning system are shown in Figure 3 (a) – (c). Figure 3(a) shows the login page interface that allows a registered user access learning contents. Registered users and learning contents are stored and contents can be updated by teachers and an administrator. Figure 3(b) shows the practical courses available and animation details. Figure 3(c) shows the animated instruction page that allows authenticated users to learn the subject. On this page, there are other sections like the category section that allows the users to see, and view all the available categories, related courses, drop review section that allows the users to give a review to the course and review section that shows all the reviews for the course.



(a) Login page



(b) Course Content Page



(c) Animated Practical Page for a Course

Figure 3: Practical Learning System Interfaces

Conclusion

This work was carried out with the aim of developing a web-based learning system for practical courses using animated instruction since students learn better by visuals and existing learning systems have not considered its implementation especially regarding practical courses. The practical learning system was implemented as a prototype to demonstrate real-world functionalities and behavior. The course material included consists of text, images, animation, demonstration programs, and computer-aided design tools. Practical learning systems when incorporated in learning especially higher education will save the learners costs in terms of time and finances and give effective demonstrative results.

References

Alhumaidhi, H. A. (2020). Animation Techniques and Styles. *World Applied Sciences Journal*, *38*(5), 422–426. https://doi.org/10.5829/idosi.wasj.2020.422.426

Barut Tugtekin, E., & Dursun, O. O. (2022). Effect of animated and interactive video variations on learners' motivation in distance Education. *Education and Information Technologies*, *27*(3), 3247–3276. https://doi.org/10.1007/s10639-021-10735-5

Gamage, K. A. A., Wijesuriya, D. I., Ekanayake, S. Y., Rennie, A. E. W., Lambert, C. G., & Gunawardhana, N. (2020). Online delivery of teaching and laboratory practices: Continuity of university programmes during COVID-19 pandemic. *Education Sciences*, *10*(10), 1–9. https://doi.org/10.3390/educsci10100291

Islam, B., Ahmed, A., Islam, K., & Shamsuddin, A. K. (2014). Child Education Through Animation: An Experimental Study. *International Journal of Computer Graphics & Animation*, *4*(4), 43–52. https://doi.org/10.5121/ijcga.2014.4404

Ismail, M. E., Irwan, M. I., Othman, H., Amiruddin, M.H., & Ariffin, A. (2017). The use of animation video in teaching to enhance the imagination and visualization of student in engineering drawing. *IOP Conference Series: Materials Science and Engineering*, *203*(1), 1-7. https://doi:10.1088/1757-899X/203/1/012023

Jawed, S., Amin, H. U., Malik, A. S., & Faye, I. (2019). Classification of Visual and Non-visual Learners Using Electroencephalographic Alpha and Gamma Activities. *Frontiers in behavioral neuroscience*, *13*, 86. https://doi.org/10.3389/fnbeh.2019.00086

Jia, M. (2014). Animation as instructional manual: The Effects of Representational and Motivational Animation on Usability.

Kwasu, I. A. and Ema, E. (2015). Effectiveness of Animated Instructional Resource for Learning Facilitation among Secondary School Student in Bauchi Nigeria. *Journal of Education and Practice*, 6(21), 113-120.

Nyirenda, P. (2019). Design and Development of a Web Based E-learning System for Sinda Day Secondary School. *The International Journal of Multi-Disciplinary Research.* Paper ID: CFP/1503.

Zhang, D., Zhou, L., Briggs, R. O., & Nunamaker, J. F. (2006). Instructional video in elearning: Assessing the impact of interactive video on learning effectiveness. *Information and Management*, 43(1), 15–27.